Reply to Letter: "The Clinical Significance of an Elevated Postoperative Glucose Value in Nondiabetic Patients After Colorectal Surgery: Evidence for the Need for Tight Glucose Control?"

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Reply:

The authors thank Kazuhiro Hanazaki and colleagues for their valued input regarding our study on the significance of elevated postoperative glucose values in nondiabetic patients undergoing colorectal surgery. Our study suggests that surgical outcomes are adversely affected by transient hyperglycemia even in nondiabetic patients undergoing major colorectal operations.[1] Interventional trials examining the benefits of tight glycemic control using intravenous insulin regimens in surgical patients have been plagued by sometimes unacceptably high rates of inadvertent iatrogenic hypoglycemia exceeding 15% in some studies as mentioned in their letter. Artificial pancreas systems are designed to automatically adjust blood glucose values in real time. The synchronous adjustment of intravenous glucose and insulin rates allows the achievement of stable glycemia in patients at need, such as those who have undergone complete pancreatectomy or with brittle diabetes. We have ourselves followed the development of such systems with great interest.

Hanazaki et al were able to demonstrate the feasibility of such an artificial pancreas system in the surgical scenario in patients undergoing hepatic, pancreatic, and esophageal resections, without a single episode of hyperglycemia as reported in their study published in the *American Journal of Surgery* a few months ago.[2] These results are very laudable and promising for patients in need of stable glycemia, as such systems may allow for an apparently risk-free tight blood glucose control, thus eliminating the most obvious risk of previous tight glycemic control algorithms. However, the effect of tight glycemic control achieved by such an artificial pancreas system on the rate of infectious complications, organ failure, or the overall mortality in a surgical cohort has not been previously evaluated.

Although Hanazaki and colleagues may be able to provide outcome data from their large experience of 305 surgical patients undergoing major abdominal resections, the obvious next step would be to compare outcomes in surgical patients receiving artificial pancreas treatment aimed at keeping perioperative blood glucose levels within the physiologic range to those not receiving such intense control. With the recent Food and Drug Administration approval of the first artificial pancreas system to go into clinical use for diabetic patients in 2013,[3] the way may now be paved for such trials in surgical and critically ill patients who will likely benefit the most from stable euglycemia. As our study has shown, it is not diabetics alone who are at risk for hyperglycemia after abdominal surgery. If the efficacy of the artificial pancreas in maintaining euglycemia can be demonstrated to improve outcomes after surgery, the role of the device will likely evolve to encompass its use in any patient undergoing major abdominal surgery.

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